Project title: Attendance and Completion Rates

Business Understanding

Business context

The purpose of this analysis is to examines whether students with higher attendance have higher course completion rates. The result can help the college identify attendance levels associated with increased risk of withdrawal or failure and support earlier intervention.

This project was developed using MYSQL/SQL student outcomes analysis covering completion and attendance rates.

Data Understanding

Data source

The source is the College Student Outcome Sample dataset.CSV file used in this report. It contains student records samples such as student id, course, mode, campus, prior attainment, target grade, final grade, completion status, attendance %, late arrival, behaviour incidents, intervention and demographic group.

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The **dB fiddle website** was used to create and develop the college student outcome sample datasets.

db<>fiddle MySQL 9.7 no sample DB run markdown clear

```
CREATE TABLE college_student_outcomes_sample(
student_id VARCHAR(20),
course VARCHAR(100),
mode VARCHAR(20),
campus VARCHAR(50),
prior_attainment DECIMAL(3,1),
target_grade INT,
final_grade DECIMAL(3,1),
completion_status VARCHAR(20),
attendance_pct DECIMAL(5,2),
late_arrivals_count INT,
behaviour_incidents INT,
intervention VARCHAR(50),
demographic_group VARCHAR(50)
);
INSERT INTO college_student_outcomes_sample
(student_id, course, mode, campus, prior_attainment, target_grade, final_grade, completion_status,
  attendance_pct, late_arrivals_count, behaviour_incidents, intervention, demographic_group)
VALUES
('S001','BTEC Business','Full-time','Main',5.2,6,6,'Completed',94,2,0,'None','Non-FSM'),
('S002','BTEC Business','Full-time','Main',4.8,6,5,'Completed',88,5,1,'Tutoring','FSM'),
('S003','BTEC Business','Part-time','Main',4.5,5, Null,'Withdrawn',62,12,3,'Mentoring','FSM'),
('S004','A-Level Maths','Full-time','Main',6.5,7,7,'Completed',96,1,0,'None','Non-FSM'),
('S005','A-Level Maths','Full-time','Main',5.9,7,6,'Completed',91,3,0,'Tutoring','Non-FSM'),
('S006','A-Level Maths','Part-time','East',5.0,6, Null,'Withdrawn',58,15,4,'None','FSM'),
('S007','A-Level English','Full-time','Main',5.5,6,6,'Completed',93,2,0,'None','Non-FSM'),
('S008','A-Level English','Full-time','East',4.7,6,5,'Completed',85,6,2,'Tutoring','FSM'),
('S009','A-Level English','Part-time','East',4.2,5, Null,'Failed',64,10,3,'Mentoring','SEND'),
('S010','Access to HE','Part-time','East',3.8,5,5,'Completed',82,7,1,'None','Non-FSM'),
('S011','Access to HE','Part-time','East',3.5,5, Null,'Withdrawn',55,14,5,'Mentoring','FSM'),
('S012','Access to HE','Full-time','Main',4.0,5,5,'Completed',89,4,1,'None','FSM'),
('S013','GCSE Resit Maths','Full-time','Main',2.8,4,4,'Completed',90,3,0,'Tutoring','FSM'),
('S014','GCSE Resit Maths','Full-time','East',2.5,4,3,'Failed',70,9,2,'None','FSM'),
('S015','GCSE Resit Maths','Part-time','East',2.6,4, Null,'Withdrawn',48,18,6,'Mentoring','SEND'),
('S016','BTEC IT','Full-time','Main',5.0,6,6,'Completed',95,2,0,'None','Non-FSM'),
('S017','BTEC IT','Full-time','Main',4.6,6,5,'Completed',87,5,1,'Tutoring','FSM'),
('S018','BTEC IT','Part-time','Main',4.3,5, Null,'Withdrawn',60,13,4,'None','FSM'),
('S019','BTEC Health & Social Care','Full-time','East',4.9,6,6,'Completed',92,3,0,'None','Non-FSM'),
('S020','BTEC Health & Social Care','Full-time','East',4.4,6,5,'Completed',86,6,1,'Tutoring','FSM'),
('S021','BTEC Health & Social Care','Part-time','East',4.0,5, Null,'Failed',63,11,3,'Mentoring','SEND'),
('S022','Foundation Diploma','Full-time','Main',3.9,5,5,'Completed',88,4,1,'None','FSM'),
('S023','Foundation Diploma','Full-time','Main',3.6,5,4,'Completed',83,7,2,'Tutoring','FSM'),
('S024','Foundation Diploma','Part-time','East',3.2,5, Null,'Withdrawn',52,16,5,'Mentoring','SEND'),
('S025','Foundation Diploma','Full-time','East',3.7,5,5,'Completed',90,3,0,'None','Non-FSM');
```

Records: 25 Duplicates: 0 Warnings: 0

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Using SQL scripts to answer the question. Does attendance impact completion rates?

```sql
-- ============================================================
-- Does attendance impact completion rates?
--
-- Approach:
-- 1. Group students into attendance bands (e.g. <70%, 70-84%, 85-94%, 95%+).
-- 2. For each band, calculate:
--    - Total students
--    - Number who completed
--    - Completion rate (%)
-- 3. Compare completion rates across bands.
--    A clear upward trend suggests attendance strongly impacts completion.
-- ============================================================

SELECT
    -- Create attendance bands using CASE
    CASE
        WHEN attendance_pct < 70 THEN 'Below 70%'
        WHEN attendance_pct BETWEEN 70 AND 84 THEN '70% - 84%'
        WHEN attendance_pct BETWEEN 85 AND 94 THEN '85% - 94%'
        WHEN attendance_pct >= 95 THEN '95% and above'
        ELSE 'Unknown'
    END AS attendance_band,

    -- Total students in this attendance band
    COUNT(*) AS total_students,

    -- Number of students who completed
    SUM(CASE WHEN completion_status = 'Completed' THEN 1 ELSE 0 END) AS completed_count,

    -- Completion rate as a percentage
    ROUND(
        100.0 * SUM(CASE WHEN completion_status = 'Completed' THEN 1 ELSE 0 END) / COUNT(*),
        1
    ) AS completion_rate_pct,

    -- Average attendance within the band (for reference)
    ROUND(AVG(attendance_pct), 1) AS avg_attendance_in_band

FROM college_student_outcomes_sample

-- Group by the attendance bands we created
GROUP BY
    CASE
        WHEN attendance_pct < 70 THEN 'Below 70%'
        WHEN attendance_pct BETWEEN 70 AND 84 THEN '70% - 84%'
        WHEN attendance_pct BETWEEN 85 AND 94 THEN '85% - 94%'
        WHEN attendance_pct >= 95 THEN '95% and above'
        ELSE 'Unknown'
    END;
```

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Output result for the attendance and completion rates:

attendance_band	total_students	completed_count	completion_rate_pct	avg_attendance_in_band
85% - 94%	12	12	100.0	89.4
Below 70%	8	0	0.0	57.8
95% and above	2	2	100.0	95.5
70% - 84%	3	2	66.7	78.3

Note: The output result of the entire college student outcome sample after implementing the script function below:

```
1 SELECT *
2 FROM college_student_outcomes_sample;
```

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Produces:

student_id	course	mode	campus	prior_attainment	target_grade	final_grade	completion_status	attendance_pct	late_arrivals_count	behaviour_incidents	intervention	demographic_group
S001	BTEC Business	Full-time	Main	5.2	6	6.0	Completed	94.00	2	0	None	Non-FSM
S002	BTEC Business	Full-time	Main	4.8	6	5.0	Completed	88.00	5	1	Tutoring	FSM
S003	BTEC Business	Part-time	Main	4.5	5	*null*	Withdrawn	62.00	12	3	Mentoring	FSM
S004	A-Level Maths	Full-time	Main	6.5	7	7.0	Completed	96.00	1	0	None	Non-FSM
S005	A-Level Maths	Full-time	Main	5.9	7	6.0	Completed	91.00	3	0	Tutoring	Non-FSM
S006	A-Level Maths	Part-time	East	5.0	6	*null*	Withdrawn	58.00	15	4	None	FSM
S007	A-Level English	Full-time	Main	5.5	6	6.0	Completed	93.00	2	0	None	Non-FSM
S008	A-Level English	Full-time	East	4.7	6	5.0	Completed	85.00	6	2	Tutoring	FSM
S009	A-Level English	Part-time	East	4.2	5	*null*	Failed	64.00	10	3	Mentoring	SEND
S010	Access to HE	Part-time	East	3.8	5	5.0	Completed	82.00	7	1	None	Non-FSM
S011	Access to HE	Part-time	East	3.5	5	*null*	Withdrawn	55.00	14	5	Mentoring	FSM
S012	Access to HE	Full-time	Main	4.0	5	5.0	Completed	89.00	4	1	None	FSM
S013	GCSE Resit Maths	Full-time	Main	2.8	4	4.0	Completed	90.00	3	0	Tutoring	FSM
S014	GCSE Resit Maths	Full-time	East	2.5	4	3.0	Failed	70.00	9	2	None	FSM
S015	GCSE Resit Maths	Part-time	East	2.6	4	*null*	Withdrawn	48.00	18	6	Mentoring	SEND
S016	BTEC IT	Full-time	Main	5.0	6	6.0	Completed	95.00	2	0	None	Non-FSM
S017	BTEC IT	Full-time	Main	4.6	6	5.0	Completed	87.00	5	1	Tutoring	FSM
S018	BTEC IT	Part-time	Main	4.3	5	*null*	Withdrawn	60.00	13	4	None	FSM
S019	BTEC Health & Social Care	Full-time	East	4.9	6	6.0	Completed	92.00	3	0	None	Non-FSM
S020	BTEC Health & Social Care	Full-time	East	4.4	6	5.0	Completed	86.00	6	1	Tutoring	FSM
S021	BTEC Health & Social Care	Part-time	East	4.0	5	*null*	Failed	63.00	11	3	Mentoring	SEND
S022	Foundation Diploma	Full-time	Main	3.9	5	5.0	Completed	88.00	4	1	None	FSM
S023	Foundation Diploma	Full-time	Main	3.6	5	4.0	Completed	83.00	7	2	Tutoring	FSM
S024	Foundation Diploma	Part-time	East	3.2	5	*null*	Withdrawn	52.00	16	5	Mentoring	SEND
S025	Foundation Diploma	Full-time	East	3.7	5	5.0	Completed	90.00	3	0	None	Non-FSM

Activate Windows
Go to Settings to activate Windows.

Findings for the attendance and completion rates:

The sample suggests a strong relationship between attendance and completion

- Students with attendance below 70% have a completion rate of 0%.
- Students with attendance between 70% and 84% have a completion rate of approximately 66.7%.
- Students with attendance between 85% and 94% have a completion rate of 100%.
- Students with attendance of 95% or above also have a completion rate of 100%.

This pattern suggests that lower attendance is associated with a greater risk of non-completion.

However, the analysis shows association rather than causation. Other factors, such as course difficulty, financial pressures, health, caring responsibilities, prior attainment or access to support, may also influence completion

Early intervention implications

Decision maker could use an attendance threshold to identify students for early support. For example:

- **Below 70%:** urgent intervention.
- **70%–84%:** monitor closely and investigate barriers.
- **85% or above:** continue routine monitoring.

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Possible interventions include:

- Contacting the student to understand the reason for absence.
- Offering mentoring or academic tutoring.
- Reviewing timetable and travel difficulties.
- Providing flexible learning arrangements where appropriate.
- Referring students to welfare, financial or safeguarding support.
- Monitoring attendance weekly rather than waiting until the end of the course.

Note: This threshold should be validated against a larger dataset before becoming formal college policy.

Limitations

- The dataset contains only 25 students.
- Some attendance bands contain very few students.
- The data does not record reasons for absence.
- Attendance may be affected by course type, campus or study mode.
- The sample does not establish that attendance alone causes completion or non-completion.
- More academic years are needed to confirm the pattern.
- Student support and intervention dates are not included.

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Conclusion

The sample shows a clear association between attendance and course completion. Students with attendance below 70% have the greatest risk of non-completion, while students with attendance of 85% or above show substantially stronger completion outcomes.

Decision maker should use attendance as an early-warning indicator, while investigating the wider personal, academic and financial factors that may be contributing to absence.

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